

Burdock

Species (Family)

Arctium majus Bernh. (Asteraceae/Compositae)

Synonym(s)

Arctium lappa L. and other *Arctium* species, *Lappa*

Part(s) Used

Root

Pharmacopoeial and Other Monographs

BHC 1992^(G6)

BHP 1996^(G9)

Martindale 32nd edition^(G43)

Mills and Bone^(G50)

PDR for Herbal Medicines 2nd edition^(G36)

Legal Category (Licensed Products)

GSL^(G37)

Constituents^(G2,G6,G22,G41,G48,G64)

Acids Acetic acid, butyric acid, caffeic acid, chlorogenic acid, gamma-guanidino-*n*-butyric acid, α -guanidino-*n*-isovaleric acid, *trans*-2-hexenoic acid, isovaleric acid, lauric acid, linoleic acid, linolenic acid, myristic acid, oleic acid, palmitic acid, propionic acid, stearic acid and tiglic acid.⁽¹⁻³⁾

Aldehydes Acetaldehyde, benzaldehyde, butyraldehyde, caproic aldehyde, isovaleraldehyde, propionaldehyde and valeraldehyde.⁽¹⁾

Carbohydrates Inulin (up to 45–50%), mucilage, pectin and sugars.

Polyacetylenes 0.001–0.002% dry weight. Fourteen identified compounds include 1,11-tridecadiene-3,5,7,9-tetrayne (50%), 1,3,11-tridecatriene-5,7,9-triyne (30%) and 1-tridecen-3,5,7,9,11-pentayne as the major components;⁽⁴⁾ arctinone-a, arctinone-b, arctinol-a, arctinol-b, arctinal, arctic acid-b, arctic acid-c, methyl arctate-b and arctinone-a acetate (sulfur-containing acetylenic compounds).^(5,6)

Other constituents Fats (0.4–0.8%), fixed and volatile oils (0.07–0.18%), sesquiterpene lactones (arct⁽⁷⁾ bitters (lappatin), resin, phytosterols (sitosterol and stigmasterol), tannin⁽⁸⁾ and lignan-type compound.⁽⁹⁻¹¹⁾

Other species Flavonol (kaempferol, quercetin) glycosides are present in *Arctium minus* (Hill) Bernh.⁽³⁾

Food Use

Burdock is listed by the Council of Europe as a natural source of food flavouring (category N2). This category indicates that burdock can be added to foodstuffs in small quantities, with a possible limitation of an active principle (as yet unspecified) in the final product.^(G16)

Herbal Use

Burdock is stated to possess diuretic and orexigenic properties. It has been used for cutaneous eruptions, rheumatism, cystitis, gout, anorexia nervosa, and specifically for eczema and psoriasis.^(G2,G6,G7,G8,G60)

Dosage

Dried root 2–6 g or by infusion three times daily.^(G7)

Liquid extract 2–8 mL (1:1 in 25% alcohol) three times daily.^(G7)

Tincture 8–12 mL (1:10 in 45% alcohol) three times daily.^(G7)

Decoction 500 mL (1:20) per day.^(G7)

Pharmacological Actions

In vitro and animal studies

The roots and leaves of burdock plants not yet flowering are stated to possess diuretic, hypoglycaemic and antifurunculosis properties.⁽⁷⁾ A burdock extract (plant part not stated) was reported to cause a sharp, long-lasting reduction in the blood sugar concentration in rats, together with an increase in carbohydrate tolerance and a reduction in toxicity.⁽¹²⁾ The antimicrobial activity documented for burdock has been attributed to the polyacetylene

constituents,⁽⁴⁾ although only traces of these compounds are found in the dried commercial herb.^(G62)

Furthermore, arctiopicrin is stated to be a bitter with antibiotic activity against Gram-positive bacteria.^(7,13) Antibacterial activity against Gram-positive (e.g. *Staphylococcus aureus*, *Bacillus subtilis*, *Mycobacterium smegmatis*) and Gram-negative (*Escherichia coli*, *Shigella flexneri*, *Shigella sonnei*) bacteria has been documented for burdock leaf and flower, whereas the root was only found to be active towards Gram-negative strains.⁽¹⁴⁾

In vivo uterine stimulant activity has been reported.^(G30)

Protection against mutagenic activity has also been documented for burdock.^(9,15,16)

Burdock reduced the mutagenicity to *Salmonella typhimurium* (TA98, TA100) of mutagens both requiring and not requiring S9 metabolic activation.⁽¹⁰⁾ A lignan-like structure was proposed for the desmutagenic factor.⁽⁹⁾ *In vivo* studies have shown that fresh or boiled plant juice from burdock may cause a significant reduction in DMBA-induced chromosome aberrations.⁽¹⁶⁾

Burdock has been reported to exhibit antitumour activity.⁽¹⁷⁾

The addition of dietary fibre (5%) from burdock roots to the diet of rats has been documented to provide protection against the toxicity of various artificial food colours.⁽¹⁸⁾

Side-effects, Toxicity

A single report of human poisoning with burdock has been documented.⁽¹⁹⁾ The patient exhibited symptoms of atropine-like poisoning following the ingestion of a commercially packaged burdock root tea. Atropine is not a constituent of burdock, and subsequent analysis indicated that the tea was contaminated with a herbal source of solanaceous alkaloids, possibly belladonna leaf. This report served to highlight the problems which may arise with inadequate quality control of herbal preparations.

The carcinogenicity of burdock was investigated in 12 rats fed dried roots (33% of diet) for 120 days, followed by a normal diet until 480 days.⁽²⁰⁾ Ten of the 12 rats survived 480 days and no tumours were detected. A urinary bladder papilloma and an oligodendroglioma were observed in one rat but these were considered to have been induced spontaneously.

Burdock has been reported to exhibit antitumour properties (see *In vitro* and animal studies).

Contra-indications, Warnings

Excessive doses may interfere with existing hypoglycaemic therapy (see *In vitro* and animal studies).

Pregnancy and lactation *In vivo* uterine stimulant action has been reported.^(G30) In view of this, and the lack of toxicity data, the use of burdock during pregnancy and lactation should be avoided.

Pharmaceutical Comment

The chemistry of burdock and related *Arctium* species has been well studied. Various pharmacological activities have been reported in animals although none support the reputed herbal uses. Documented bitter constituents, however, may explain the traditional use of burdock as an orexigenic. In view of the lack of toxicity data, excessive use of burdock should be avoided.

References

See also General References G2, G5, G6, G9, G10, G16, G20, G22, G30, G31, G32, G36, G37, G41, G43, G48, G56, G60, G62 and G64.

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